

# Solar Decathlon™

## Amended Rules and Regulations

March 13, 2002

### 3.9. Contest 8: Lighting—Amended

Goal: Sunlight, moonlight, and electric light all contribute to the livability and environment of a dwelling, inside and out. This Contest judges the quantity, quality, and energy efficiency of the lighting in the house during both the daytime and the nighttime. The lighting system should be designed to minimize energy use by maximizing daylighting contribution and by using controls to minimize use of electric illumination.

Criteria:

- Design verification—To satisfy occupant requirements, lighting levels in the solar house must meet the design levels listed below in Table 1.
- System capacity—Working surfaces will be monitored continuously to determine that system capacity is achieved.
- Lighting environment—The combination of electric and natural lighting should provide a pleasant and attractive environment.

**Table 1. Design Lighting Levels by Location**

Space	Task Design Level Averages (foot-candles)	Task Measurement Location	Ambient Design Level Averages (foot-candles)	Ambient Measurement Location
Living Space	30	Average of readings taken at center of any desk or table and 2 ft. above the seat of any reading chair	5	Average of 4 readings taken 3 ft. above floor at arbitrarily chosen locations as close to the center of the room as possible but no closer than 3 ft. from a task measurement
Office Space	50	At office working surface or desk	5	Average of 4 readings taken 3 ft. above floor at arbitrarily chosen locations as close to the center of the room

				as possible but no closer than 3 ft. from a task measurement
Kitchen Space	30	Average of readings taken at center of any countertop, range top and sink	10	Average of 4 readings taken 3 ft. above floor at arbitrarily chosen locations as close to the center of the room as possible but no closer than 3 ft. from a task measurement
Bedroom Space	15	At pillow	5	Average of 4 readings taken 3 ft. above floor at arbitrarily chosen locations as close to the center of the room as possible but no closer than 3 ft. from a task measurement
Bathroom Space	30	At sink	10	Average of 4 readings taken 3 ft. above floor at arbitrarily chosen locations as close to the center of the room as possible but no closer than 3 ft. from a task measurement

To determine compliance with lighting level requirements, light level readings\* will be taken in each of the locations per Table 1, once during the day and once between dusk and 9:45 P.M. Readings will be taken in the horizontal plane at 30 in. above the floor (or top of counter or surface if higher). Electric lights can be used if needed to achieve required light levels. A maximum of 60 points can be achieved from the daytime and nighttime evaluations.

Points will be awarded as follows:

<b>Measured Light Level Reading</b>	<b>Points Available Per Location From Table 1 (Maximum 30 Points Per Evaluation)</b>
95% of criteria from Table 1	3
75%-94% of criteria from Table 1	2
50%-74% of criteria from Table 1	1
Below 50% of criteria from Table 1	0

To determine that system capacity is achieved, the working surface of the office space will be monitored continuously throughout the day from 9:00 A.M. to 5:00 P.M. One location on the Kitchen work surface will be measured continuously from 7:00 A.M. to 9:00 A.M. and from 5:00 P.M. to 7:00 P.M. Continuous light level readings\* will be taken at one of the same locations and with the same meter as the initial daytime and nighttime evaluations. Teams will begin with 20 points. Points will be subtracted from the initial 20 points if the light levels in the Office or Kitchen drop during the designated times. The lowest score for this portion of the contest is 0 points; teams will not be able to have a negative point value for this portion of the contest. Scoring will be determined as follows:

<b><u>Measured Light Level Reading</u></b>	<b>Points Subtracted from Initial Points (20 Initial Points)</b>
95% and up of the criteria from Table 1	0
50%-94% of criteria from Table 1	1
20%-49% of criteria from Table 1	2
Below 20% of criteria from Table 1	3

To determine aesthetic appeal and the subjective achievement of the lighting design, Judges will award points in a subjective process using the following point system.

<b><u>Scoring by Panel of Five Judges</u></b>	<b>Points Available</b>
Innovation of system/integration of system	10
Consumer appeal/Lighting environment	10

\*Light level readings: Light level readings shall be made using a recently calibrated, cosine and color corrected illuminance field instrument. Measurements shall be taken carefully to avoid body shadow, preferably by using a meter with remote measuring head, or by “ducking” to prevent body shadow. The meter shall be laid flat or mounted to a tripod or similar device and leveled.